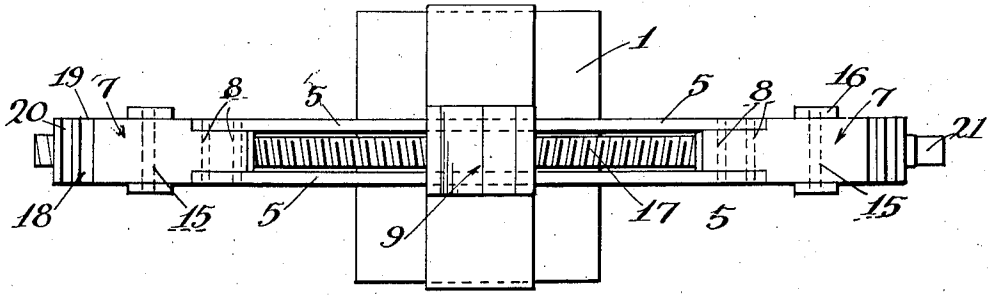
Feb. 5, 1929. 1,701,314

L. G. SHOOK

JACK

Filed Oct. 1, 1927 2 Sheets-Sheet 1

Fig. 1.



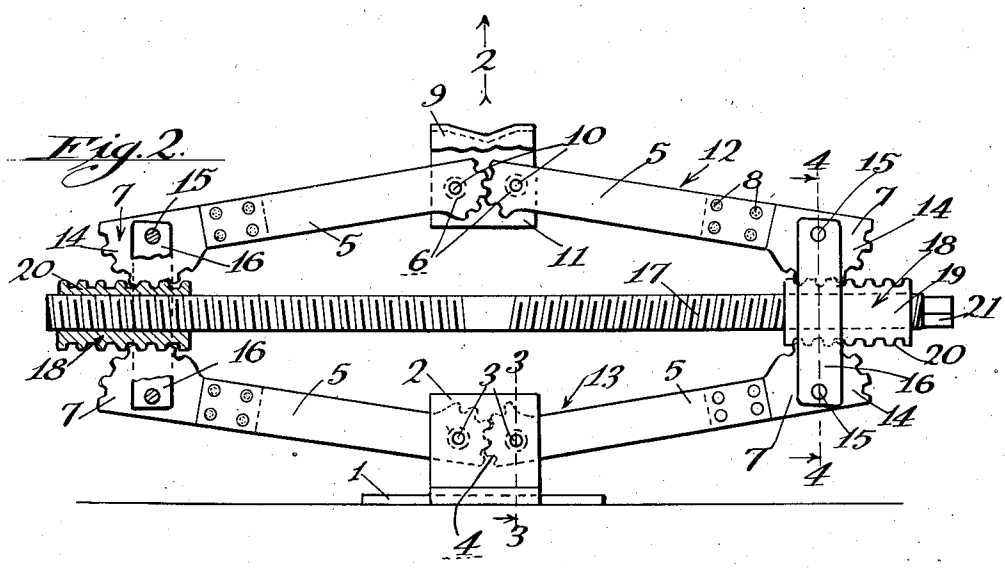
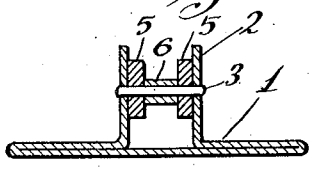


Fig. 2.

Fig. 3.



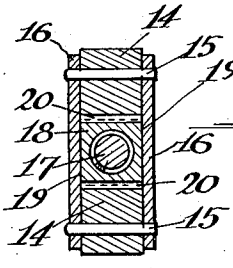


Fig. 4.

Inventor
Lawrence G. Shook
by Hazard and Miller
Attorneys.

Feb. 5, 1929. 1,701,314

L. G. SHOOK

JACK

Filed Oct. 1, 1927 2 Sheets-Sheet 2

Fig. 5.

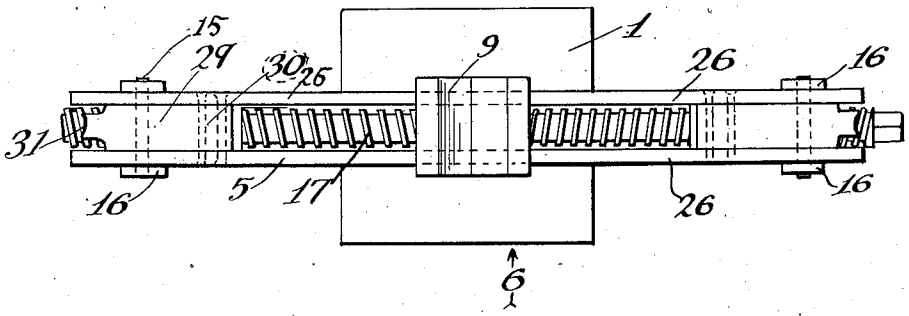
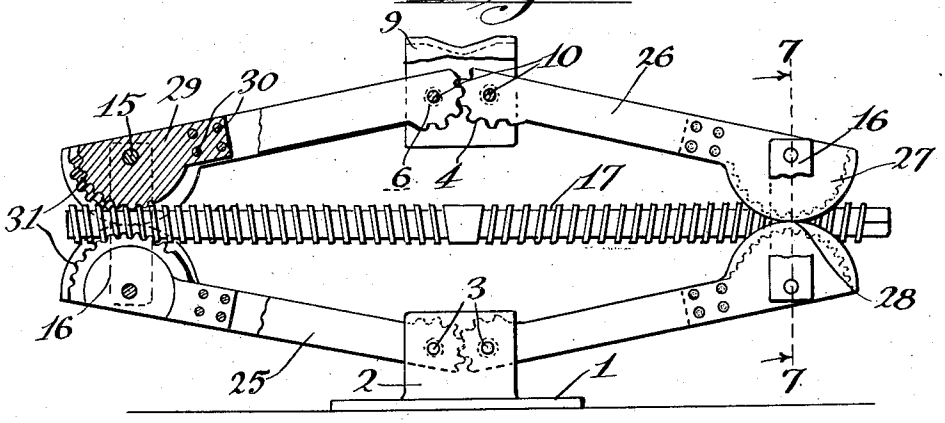


Fig. 6.



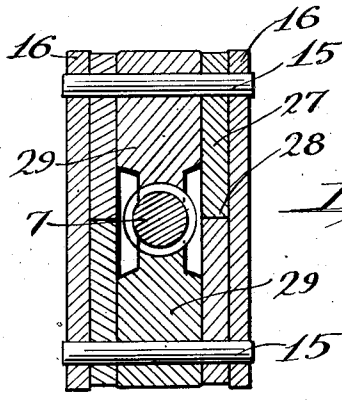


Fig. 7.

Inventor:
Lawrence G. Shook
by Hazard and Miller
Attorneys

Patented Feb. 5, 1929. 1,701,314

UNITED STATES PATENT OFFICE.

LAWRENCE G. SHOOK, OF LOS ANGELES, CALIFORNIA.

JACK.

Application filed October 1, 1927. Serial No. 223,334.

My invention is a lifting jack particularly adapted for use for automobiles or the like, this being a jack which may be collapsed to occupy a small space and being easily operated to lift heavy cars or the like.

An object of my invention is the construction of a jack which may be operated by turning or rotating the screw, the rotation of the screw actuating two pairs of arms somewhat on the toggle principle so that when an axle of the car is engaged it may be readily lifted.

A particular object of my invention is the arrangement for interconnecting the toggle arms to the screw so that as the arms are drawn inwardly or outwardly along the screw they also act to swing in an upward or downward direction.

Another feature of my invention is the interconnecting of the toggle arms with the screw to cause the ends connected to the screw to be drawn to and over each other and also at the same time swinging the ends connected to the base and to the head upwardly and downwardly, as well as having the ends connected to the base and the head interconnected by teeth segments. I prefer to perform the interconnection between the ends of the toggle arms by means of geared segments or the equivalent.

In one construction I utilize a pair of nuts on each end of the operating screw, these nuts being held from rotation and having rack teeth on opposite edges. These rack teeth engage teeth on the segments of the toggle arms at their outer ends thus causing the arms to swing as the nuts are drawn towards the center of the screw or forced outwardly. In another construction the segments on the outer ends of the toggle arms are formed with a worm type of gear which engages directly with the thread on the screw, such segments, therefore, functioning as a nut, causing the outer ends of the toggle arms to travel in the direction in which the screws are operating and also the worm and gear connection regulates the angular turning of the toggle arms.

It is well known that in the toggle type of screw operated lifting jacks when the jacks are in their lowered position in which the arms are at a small angle to the screw it requires a large amount of power to lift the weight being elevated and it is very often difficult to start such jacks in lifting the weight. When, however, the toggle arms approach each other in a vertical direction and are at a small angle to the vertical it is comparatively easy to actuate the jacks. A characteristic of my jack is the feature of a torque or angular turn being imparted to the toggle arms throughout their whole movement, this being especially effective when the jack is in its lowered position to raise a weight. The positive turning force given to the arms facilitates the opening of the jack and is an especially valuable feature where the clearance between the ground and the bottom of the article to be lifted is comparatively small.

My invention in its various aspects will be understood from the following description of drawings, in which:

Figure 1 is a plan view of one type of jack,

Fig. 2 is a side elevation taken in the direction of the arrow 2 of Figure 1, partly broken away,

Fig. 3 is a detailed vertical section through the base on the line 3—3 of Figure 2,

Fig. 4 is a detailed vertical section on the line 4—4 of Figure 2 in the direction of the arrows,

Fig. 5 is a horizontal view of a modified form of jack,

Fig. 6 is a side elevation taken in the direction of the arrow 6 of Figure 5 partly broken away, and

Fig. 7 is a vertical section taken upon the line 7—7 upon Fig. 6.

The form of jack illustrated in Figures 1 to 4 is substantially as follows:

The base 1 has a pair of upstanding flanges 2 with a pair of pivot pins 3 extending therethrough. Each of the toggle arms are pivoted to one of the pivot pins and both have geared segments 4 intermeshing. The inner ends of the toggle arms, that is, the ends connected to the base and the head are actuated simultaneously due to the intermeshing teeth 4. Each of the toggle arms is made substantially similar and has sidebars 5, on the pivots 3 being spaced by sleeve 6. At the outer ends blocks 7 are secured to the bars 5 by rivets 8 or the like. The head 9 is preferably channel shaped having the pivot pins 10 extending through the flanges 11 with the sleeve 6 separating the ends somewhat as in regard to the base.

The upper toggle arms are designated generally by the numeral 12 and the lower toggle arms generally by the numeral 13. The blocks 7 of each of these arms have a toothed

segment 14 and at the axial center of the segment are pivot pins 15 between which the strap links 16 are connected. These strap links are on the opposite sides of the arms and segments.

The operating screw 17 is reversely threaded and has nuts 18 threaded thereon, these nuts being flattened on the sides 19 next the straps 16 and have rack teeth 20 thereon which engage with the teeth of the segments. A wrench grip 21 may be on either or both ends of the screw to rotate the same. In the operation of my jack on the rotation of the screw, presuming the jack is in a lowered position, the nuts are drawn inwardly toward each other being forced by the reverse threads on the screw and in such inward travel the inner ends of the toggles have a pressure toward each other and as they cannot approach longitudinally of the screw these ends are forced to part, that is, the head is separated from the base. The inward movement of the nuts also swings the arms, due to the engagement of the rack teeth on the nuts with the teeth on the segments 14. This action forces the inner ends of the upper arms upwardly and the inner ends of the lower arms downwardly relative to the screw.

In lowering the jack the operation is substantially the reverse of that above set forth, it being necessary to rotate the screw as the weight of the vehicle cannot depress the jack even when the arms are considerably flattened out relative to the screw. It is to be noted in the construction above described that the straps 16 are not connected to the nuts but are pivotally connected to the toggle arms at the axial center of the toothed segment in mesh with the threads of the screw. The construction of the jack of Figures 5, 6 and 7, is substantially as follows in so far as it differs from that of Figures 1, 3 and 4: the lower and upper toggle arms 25 and 26 are each formed of two side bars which extend from the intermeshing teeth 4 to the curved segmental ends 27. These ends are positioned to contact as indicated by the numeral 28, such ends being held by straps 16, having pivot bars 15, as in the former construction. Blocks 29 are secured by rivets 30 to the side bars of the lower and upper toggle arms. These blocks have worm gear teeth 31 to mesh with the threads of the screw 17.

In the operation of the jack of Figures 5, 6 and 7, assuming the same is in a lowered position as shown in Figure 6, on rotation of the screw in the proper direction the intermeshing of the threads of the screw and the worm threads 31 of the segments cause the outer ends of the toggle arms to be drawn inwardly and at the same time the head and base are pressed apart. The inner ends of the arms have oscillating or swinging motion. In this case the intermeshing teeth on the inner ends of the arms cause these to move simultaneously through the same arc. In the action of the lifting jack, when there is a heavy weight on the jack the pressure is transmitted between the rolling segments 27, which, as above described, have a contact point at 28, thus there is no heavy thrust placed on the screw or the worm geared teeth 31. In the reverse operation the weight of the vehicle cannot lower the jack on account of the worm and gear operation and even when the toggle arms are in a position with slight angularity to the screw, the heavy weight of the vehicle cannot force the head and base together but requires continuous operation of the screw to lower the jack.

It will be noted that a characteristic feature of my invention is the segmental gears on the outer ends of the toggle arms, these having a function of exerting a turning torque on the toggle arms tending to spread the base and the head apart when the weight is being lifted. This construction facilitates the lifting of heavy weights especially when the jack is in substantially its collapsed position or the toggle arms and screw are at a relatively small angle to each other. Therefore, by this construction with less power applied to the screw I am enabled to lift heavier weights when the jack is nearly in a collapsed position than with the ordinary type of screw thread and toggle arm type of jack.

Another feature to be noted in regard to my invention is that the length of the lever arm provided by the segments on the ends of the toggle arms connected to the nuts or directly to the screw may be changed in relation to the length of such arms between the pivotal connection to the links and the pivotal connection to the head or base. Such change will change the leverage with which the toggle arms function in relation to the head and the base in spreading the same apart.

If a certain definite lift for the jack is required and, the head and base being of substantially constant size, if the segments are increased in radius, the length of the toggle arms from the axial center of the segments to their pivotal connection to the head and base may be shortened.

It will be understood that various changes may be made in the details of the construction without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A jack comprising a combination, a plurality of toggle arms, the inner ends being connected to a base and a head, a screw and a grooved segment on the outer end of the arms, and means forming an operative geared connection between the segments and the screw.

2. A jack comprising a combination, a plu-

rality of toggle arms, the inner ends being connected to a base and a head, a screw, a plurality of nuts on the screw and a geared connection between the nuts and the outer ends of the arms.

3. A jack comprising a combination, a plurality of toggle arms, the inner ends being connected to a base and a head, a screw, a plurality of nuts on the screw, means restraining said nuts from rotation, a geared connection between the outer ends of the arms and the nuts, and a pivotal connection between the plurality of pairs of the toggle arms.

4. A jack comprising a combination, a pair of upper and lower toggle arms connected at their inner ends to a head and a base respectively, a screw, a pair of nuts on said screw, links pivotally connecting the outer ends of the upper and lower pair of toggle arms and a geared connection between the outer ends of said arms and the nuts.

5. A jack as claimed in claim 4, links engaging the nuts and preventing the rotation of same, said nuts having rack teeth and the outer ends of the toggle arms having segments with teeth meshing with said racks.

6. A jack comprising in combination, an upper and lower pair of toggle arms, the inner ends of said arms being pivotally connected to a head and a base respectively, intermeshing geared teeth on the inner ends of said arms, a screw having reverse threads, a pair of nuts having racks on their upper and lower edges, segments having geared teeth on the outer ends of the arms, said geared teeth meshing with the racks, and links pivotally connected to the outer ends of the arms.

7. A jack comprising a base, a head, an upper pair of arms having their inner ends pivotally connected to the head, a lower pair of arms having their inner ends pivotally connected to the base, means pivotally connected to the outer ends of corresponding arms of the pairs and connecting them to each other, the pivots at the outer ends of the arms constituting fulcrums, there being teeth formed on the outer ends of the arms, and means engageable upon the teeth for drawing the outer ends of the arms inwardly.

In testimony whereof I have signed my name to this specification.

LAWRENCE G. SHOOK.